

1 CLAIMS

2 What is claimed is:

3       1. A membrane for use in a testing cell to isolate a  
4 specimen, said membrane comprising a flexible film having a  
5 thickness, said membrane adapted to envelope a specimen,  
6 instrumentation embedded in said thickness for measuring a  
7 physical property of a specimen.

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9       2. A membrane of claim 1 wherein said physical property  
10 being one of the group consisting of stresses, strains,  
11 deformation, temperature, soil suction or moisture content.

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13       3. A membrane of claim 1 wherein said membrane has a  
14 longitudinal axis and a radial axis, said instrumentation  
15 oriented in said membrane to measure said physical property in  
16 the longitudinal direction.

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18       4. A membrane of claim 1 wherein said membrane is  
19 tubular, said instrumentation oriented in said membrane to  
20 measure said physical property in the circumferential  
21 direction.

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23       5. A membrane of claim 4 wherein said membrane has a  
24 longitudinal axis and a radial axis, said instrumentation

1        oriented in said membrane to measure said property in the  
2        longitudinal direction.

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4        6. A membrane of claim 1 wherein said instrumentation is  
5        oriented in multiple directions in said membrane to measure  
6        said physical property and calculate Poisson's ratio.

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8        7. A membrane for use in a testing cell to isolate a  
9        specimen, said membrane comprising a flexible film having a  
10       thickness, said membrane adapted to envelope a specimen,  
11       instrumentation embedded in said thickness for measuring  
12       strains causing deformation of a specimen.

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14       8. A membrane of claim 7 wherein said membrane has a  
15       longitudinal axis and a radial axis, said instrumentation  
16       oriented in said membrane to measure strains in the  
17       longitudinal direction.

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19       9. A membrane of claim 7 wherein said membrane is  
20       tubular, said instrumentation oriented in said membrane to  
21       measure circumferential properties in response to stresses.

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23       10. A membrane of claim 9 wherein said membrane has a  
24       longitudinal axis and a radial axis, said instrumentation

1        oriented in said membrane to measure strains in the  
2        longitudinal direction.

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4            11. A membrane of claim 7 wherein said instrumentation is  
5        oriented in multiple directions in said membrane to measure  
6        specific deformation properties to arrive at Poisson's ratio.

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8            12. A membrane of claim 7 wherein said instrumentation  
9        includes an instrument for measuring temperature in the  
10       specimen.

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12            13. A membrane of claim 7 wherein said instrumentation  
13        includes an instrument for measuring moisture content of the  
14       specimen.

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16            14. The membrane of claim 7 wherein said instrumentation  
17        includes an instrument for measuring soil potential.

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19            15. A method of manufacturing a flexible membrane with  
20        cavities to receive instrumentation comprising the steps of  
21        providing a mold having an inside wall, an outside wall, and an  
22        end wall between said inside wall and said outside wall,  
23        forming openings in said outside wall, attaching mold plates to  
24        said outside wall, said mold plates extending toward said

1       inside wall, attaching flats to said mold plates, said flats  
2       including mold cavity components disposed within said mold  
3       plates, said flats closing said openings, adding a membrane  
4       material to said mold between said inside wall and said outside  
5       wall, curing said membrane material, removing said flats, said  
6       mold cavity components and said mold plates.

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8           16. A method of claim 15 wherein said mold is circular.

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10          17. A method of claim 15 wherein said mold is rotated to  
11       dispose said membrane material uniformly about said inside wall  
12       and within said mold plates.

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